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Project Title:	Flexible Demand Appliance Standards for Low-Voltage Thermostats
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Document Title:	RFI for Low-voltage Thermostat Flex Demand
Description:	Written comments due November 27, 2024. Request for Information to solicit stakeholder feedback and responses to a range of questions that will inform staff development of a potential Flexible Demand Appliance Standard (FDAS) for low-voltage thermostats.
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CEC-057 (Revised 1/21)

Request for Information (RFI)
Potential Flexible Demand Appliance Standards for Low-Voltage Thermostats

Docket # 24-FDAS-03

Written Comments Due November 27, 2024

The California Energy Commission (CEC) is publishing this Request for Information (RFI) to solicit stakeholder feedback and responses to a range of questions that will inform staff development of a potential Flexible Demand Appliance Standard (FDAS) for low-voltage thermostats.

Background

The CEC is developing flexible demand standards for appliances to meet the requirements of Senate Bill 49 (Skinner, 2019), which authorized the CEC to pursue standards that enable appliances to schedule, shift, or curtail their operations with consumer consent. The expansion of flexible demand resources in California supports the alignment of electric demand with clean energy production to reduce greenhouse gas (GHG) emissions and enhance grid reliability. The CEC has established a goal for realizing at least 7000 MW of flexible load by 2030, with at least 3000 MW expected to be enabled by Load-Modifying or similar load flexibility standards.[1]

To implement SB 49, the CEC began considering FDAS candidates and approaches in 2020 and has provided stakeholders with opportunities to provide input.[2] The first FDAS for pool controls was adopted in October 2023, introducing an overall framework for future standards to expand upon. CEC continues to examine potential flexible demand standards for a range of appliances in parallel to this RFI for low-voltage thermostats. Other appliance categories under consideration include electric storage water heaters, electric vehicle supply equipment, and battery energy storage systems, among others.

1 CEC 2023. "Senate Bill 846 Load Shift Goal Report." Available at https://www.energy.ca.gov/publications/2023/senate-bill-846-load-shift-goal-report.

2 Steffensen, Sean. 2020. Introduction to Flexible Demand Appliance Standards. California Energy Commission. Publication Number: CEC-400-2020-013.

CEC staff will periodically request public input on any other candidate appliance types that should be considered. The focus of this immediate RFI is narrowly focused on potential measures to facilitate load flexibility for low-voltage thermostats.

Purpose of Request

CEC staff is investigating methods to facilitate shifting the energy loads created by heating, ventilation, and air conditioning (HVAC) systems. The goal of this plan is to manage heating and cooling energy loads in order to lower GHG emissions and utility bills for participating electricity customers, and to support grid reliability. HVAC systems, particularly air conditioning, account for up to 50% of household energy use and 60-70% of peak demand, making them a critical focus for Flexible Demand Appliance Standards (FDAS). Optimizing HVAC for flexible demand can significantly reduce energy consumption during peak times, improving grid stability and lowering costs. Therefore, an FDAS for thermostats is a priority for consideration by the CEC.[3]

To submit data confidentially to the Commission, please follow the process that is outlined in 20 CCR 2505.[4]

Staff requests responses to the following questions and topics focused on low-voltage thermostats for HVAC systems:

1. Staff is considering the appliances in **Table 1** as a baseline for the low-voltage thermostat rulemaking scope. Are there additional examples that might be considered in-scope or out-of-scope?

3 U.S. Department of Energy (DOE). 2020. "Residential Energy Consumption Survey (RECS)". Available at https://www.energy.gov/eere/buildings/buildings-sector.
Environmental Protection Agency (EPA) / Energy Star. 2022. "A Guide to Energy Efficient Heating and Cooling" Available at https://www.energystar.gov/products/tools_resources/guide-energy-efficient-heating-and-cooling-hvac-guide.
Lawrence Berkeley National Laboratory (LBNL). 2020. "The California Demand Response Potential Study, Phase 3". Available at https://eta.lbl.gov/publications.
4 California Code of Regulations. 2024. "Confidential Information". Available at https://govt.westlaw.com/calregs/Document/IDC777F435CCE11EC9220000D3A7C4BC3?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

Table 1: Examples of In and Out-of-Scope Low-voltage Thermostats

In-Scope Devices	Out-of-Scope Devices
▪ Low-voltage thermostats ▪ Low-voltage thermostats that are part of other systems including security systems	▪ Line voltage thermostats ▪ Millivolt thermostats ▪ Building management system temperature controls ▪ Standalone temperature sensors ▪ User interfaces without low voltage interface to equipment

Source: California Energy Commission

2. Staff is considering the low-voltage thermostat market share from *2019 California Residential Appliance Saturation Study* (RASS) in **Table 2** as a baseline for the low-voltage thermostat scope. Are there additional data sources that might be considered? [5]

Table 2: 2019 RASS Survey Result for Low-voltage Thermostat

2019 RASS Survey Type of Thermostat	2019 RASS Survey Number of thermostats	2019 RASS Survey Percentage of Each
Smart	1,430,449	21%
Programable	3,983,601	57%
Non-programable	1,523,552	22%
OpenADR	0	0%
Total	6,937,602	100%

Source: RASS. 2019 Survey.

3. Staff is considering using hourly HVAC energy use estimates from the Hourly Electric Load Model (HELM).[6] What other HVAC load-shape data sources are currently available?

4. Staff assumes a 10-year lifetime for a low-voltage thermostat. Are there alternative assumptions for product lifetime that staff should consider? Please reference the sources of those alternative assumptions.

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5 RASS. 2019. "California Statewide Residential Appliance Saturation Study." Available at https://webtools.dnv.com/CA_RASS/Default.aspx.

6 Baroiant, Sasha, John Barnes, Daniel Chapman, Steven Keates, and Jeffrey Phung (ADM Associates, Inc.). 2019. "California Investor-Owned Utility Electricity Load Shapes." CEC. Publication Number: CEC-500-2019-046. Available at https://www.energy.ca.gov/sites/default/files/2021-06/CEC-500-2019-046.pdf.

5. Staff has identified a range of typical flexible demand functions associated with low-voltage thermostats. Staff may consider using Joint Appendix JA5 *Technical Specifications For Occupant Controlled Smart Thermostats* as a baseline standard for functions in low-voltage thermostats.[7] Provide a current market share and likely incremental cost of including the following capabilities:
    a. Bi-directional communications.
    b. Hourly scheduling capability.
    c. Device software optimization for GHG.
    d. Device software optimization for hourly electricity pricing rates.
    e. Cybersecurity.
6. Staff estimates the total incremental cost to consumers (the difference in purchase price between a flexible-demand low-voltage thermostat and a non-flexible-demand low-voltage thermostat) to be $25. Staff is seeking input on whether this estimate is reasonable.
7. Staff may consider using Title 20, California Code of Regulations, Section 1692(c) General Requirements as a baseline standard for cybersecurity in low-voltage thermostats. Are there any additional cybersecurity requirements to be considered?[8]
8. Provide information on any demand response programs currently used in California or other locations for HVAC loads that use the thermostat for load control, including the following.
    a. How many low-voltage thermostats are used in these demand response programs?
    b. How much energy load in kW is each low-voltage thermostat shifting?
    c. What is the time shift duration?
    d. What are the participation rates with an opt-in and opt-out framework?
9. Is there anything like a common communications protocol or platform with significant market share, and/or which could facilitate aggregation of HVAC

7 California Building Code. 2022. "Joint Appendix JA5." Available at https://www.energy.ca.gov/sites/default/files/2022-08/CEC-400-2022-010-AP.pdf.

8 California Code of Regulations. 2024. "Title 20, Section 1692(c)". Available at https://govt.westlaw.com/calregs/Document/I9BEDE7A0D23A11EEB406D624B0AE89D3?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default).

systems via thermostatic controls? Please feel free to describe alternatives to ensuring effective and reliable communications with targeted aggregations of (customer-consented) HVAC loads.

10. Please discuss strategies for low-voltage thermostats to best utilize the CEC's Market Informed Demand Automation Server (MIDAS), which provides access to utilities' time-varying rates, GHG emission signals, and California Independent System Operator (California ISO) Flex Alerts. More details can be found here: Market Informed Demand Automation Server (MIDAS) (ca.gov).[9]

11. What percentage of low-voltage thermostats sold in California have an ability to respond to data originated from MIDAS to alter the HVAC operating schedule? Describe whether low-voltage thermostats can respond to MIDAS's price, GHG, or flex Alert.

Submitting Comments to the CEC Docket

Participation in this RFI is highly encouraged. Public input is essential to ensure a complete record for this pre-rulemaking proceeding.

Written comments, proposals, and other technical material must be submitted to the Docket Unit by **November 27, 2024.** Written comments, attachments, and associated contact information (for example, address, telephone number, email address) will become part of the public record of this proceeding, with access available via any internet search engine. The CEC encourages use of its electronic commenting system. Visit the e-commenting page,https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=24-FDAS-03, which links to the comment page for this docket. Enter your contact information and a comment title describing the subject of your comment(s). Comments may be included in the "Comment Text" box or attached in a format consistent with CCR, Title 20, section 1208.1. The maximum file size is 10 MB.

Written materials may also be submitted by email. Include the docket number **24-FDAS-03** and "Request for Information Potential Flexible Demand Appliance Standards for Low-Voltage Thermostats" in the subject line and send to docket@energy.ca.gov.

If preferred, a paper copy may be submitted to:

California Energy Commission
Docket Unit
Re: Docket 24-FDAS-03
715 P Street
Sacramento, CA 95814

9 Market Informed Demand Automation Server (MIDAS). Available at https://www.energy.ca.gov/proceedings/market-informed-demand-automation-server-midas.

If interested parties wish to maintain the confidentiality of specific data or information, they should submit an application for confidentiality and the confidential documents directly to the Docket Unit through the e-filing system. For information on applying for confidentiality, interested parties should contact the Docket Unit in the CEC's Chief Counsel's Office before submitting a response to this RFI. Otherwise, all responses received will become publicly available. Visit the Docket Unit page, https://www.energy.ca.gov/about/divisions-and-offices/chief-counsels-office/docket-unit, which links the application for confidentiality.

Questions regarding submitting comments to the docket, including inquiries regarding confidentiality, should be referred to the Docket Unit at docket@energy.ca.gov or (916) 654-5076.

Public Advisor and Other Commission Contacts
The CEC's Public Advisor assists the public with participating in CEC proceedings. To request interpreting services, reasonable modification or accommodations, and other modifications, contact the Public Advisor at publicadvisor@energy.ca.gov or by phone at (916) 957-7910. Requests should be made as soon as possible but at least five days in advance. The CEC will work diligently to meet all requests based on availability.

Direct questions on the subject matter of this RFI to Bruce Helft at bruce.helft@energy.ca.gov, (916) 232-9045.

Media
Direct media inquiries to the Media and Public Communications Office at mediaoffice@energy.ca.gov or call (916) 654-4989.

Subscribing to E-mail List Servers
Interested parties who would like to follow or participate in this proceeding should subscribe to the "Flexible Demand Appliances and Load Management and Demand Response" subscription list found at the CEC's subscriptions webpage, https://www.energy.ca.gov/subscriptions. By subscribing to this list, interested parties are consenting to receive information, notices, and other communications, including information associated with CEC's load flexibility rulemaking proceedings, by electronic mail.

Availability of Documents
All records for the process will be accessible in the Load Flexibility Policy & Planning, Docket https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=24-FDAS-03. When new information is posted, an email will be sent to those on the Flexible Demand Appliances and Load Management and Demand Response listserv. To subscribe to that listserv visit the Flexible Demand Appliances home page at: https://www.energy.ca.gov/proceedings/active-proceedings/flexible-demand-appliances